Listing of Claims:

We claim:

1. (Currently Amended) A ~~tomosynthesis~~ method for ~~creating~~ producing a three-dimensional image ~~reconstruction~~ of a target ~~element~~ volume in a subject comprising:

acquiring ~~radiation absorbance images~~projection data from ~~of~~ the target ~~image~~ volume ~~through~~ over a limited plurality of angles using an imaging system;

~~dividing~~ segmenting the acquired ~~target element volume~~projection data into a plurality of partially overlapping volume segments such that neighboring volume segments each include projection data corresponding to ~~an equivalent volume in the subject~~the partially overlapping volume segments;

applying a reconstruction algorithm to each volume segment to generate a ~~three-dimensional reconstruction of each~~plurality of reconstructed volume ~~segment~~segments, each of the plurality of reconstructed volume segments including a central region and an underdetermined peripheral region; and

merging the ~~three-dimensional reconstruction~~ central regions of each reconstructed volume segment to ~~create~~ produce a the three-dimensional ~~reconstruction~~ image of the target volume.

2. (Currently Amended) The method of claim 1, wherein the ~~Volume segments overlap~~ three-dimensional image is formed from voxels corresponding to the central regions of the plurality of reconstructed volume segments.

3. (Currently Amended) The method of claim 2, wherein the ~~volume segments overlap by an amount sufficient to result in a three-dimensional reconstruction of the target volume that does not differ substantially in quality from an unsegmented reconstruction~~ three-dimensional image is not formed from voxels corresponding to the underdetermined peripheral region.

4. (Currently Amended) The method of claim ~~3~~1, wherein the ~~value of a majority of the pixels in the three-dimensional reconstruction of the target volume differ by less than about 1% from pixels in the unsegmented~~ reconstruction algorithm includes a shift of slice center operation.

5. (Currently Amended) The method of claim ~~2~~4, wherein a shift amount applied by the shift of slice center operation is determined by at least one of a distance of a portion of the target volume from a detector of the imaging system, a slope of slant of the portion of the target volume, and a slope of a slanted volume varied for each volume segment ~~segments overlap by between about 0 and 50 percent~~.

6. (Currently Amended) The method of claim 1, wherein the volume segments comprise ~~volume segments~~ have~~ing~~ a complex shape ~~that is~~ dependent upon ~~the~~ an acquisition geometry ~~and makes the~~ and configured to allow reconstruction of ~~each~~ a given volume segment independent of ~~the~~ reconstruction of ~~any~~ other volume segment~~s~~.

7. (Currently Amended) The method of claim ~~1~~6, wherein the volume segments ~~comprise volume segments~~ have~~ing~~ a slanted rectangular shape ~~so that the reconstruction of each segment is independent of the reconstruction of any other segment~~.

8. (Currently Amended) The method of claim 1, wherein the imaging system is a tomographic imaging system~~es are obtained using an image acquisition element having: a radiation source positionable at a plurality of positions with respect to the target element; and a radiation detector positioned so as to detect radiation emitted by the radiation source passing through the target element and determine a plurality of attenuation value for radiation passing through the target element to establish a radiation absorbance projection image of the target element for a particular radiation source position~~.

9. (Currently Amended) The method of claim 8, wherein the tomographic imaging system includes radiation source ~~is~~ positionable at a plurality of angles ~~in a first plane~~relative to the subject.

10-15. Canceled.

16. (Currently Amended) A system for ~~three-dimensional tomosynthesis~~ creating an image~~ing~~ of a target element comprising:

an image acquisition element for obtaining a plurality of images of the target element from a plurality of angles having~~:~~ a radiation source positionable at a plurality of positions with respect to the target element~~;~~ and a radiation detector positioned so as to detect radiation emitted by the radiation source passing through the target element and determine a plurality of attenuation values for radiation passing through the target element ~~to establish a radiation absorbance projection image of the target element for a particular radiation source position~~; and

a processor system configured to receive an indication of the plurality of attenuation values as a plurality of imaging data sets and to:

~~apply a reconstruction algorithm to the radiation absorbance projection images of the target element obtained from a plurality of radiation source angles to generate a three-dimensional reconstruction of the target element wherein the processor is further configured to~~

divide the ~~target volume into a~~ plurality of imaginge data sets into ~~reconstruction~~ a plurality of partially overlapping volume segments ~~for separate image reconstruction of the volume segments and mergence of the reconstructed volume segments into a three-dimensional reconstruction of the target element~~;

reconstruct each volume segment to generate a plurality of reconstructed volume segments, each of the plurality of reconstructed volume segments including a central region and an underdetermined peripheral region; and

merge the central regions of each reconstructed volume segment to produce an image of the target volume.

17. (Currently Amended) The system of claim 16, wherein the processor system comprises a plurality of processors configured to reconstruct each volume segment in parallel~~with at least one segment reconstruction being carried out using a first processor of the plurality of processors and at least one segment reconstruction being carried out using a second processor of the plurality of processors~~.

18. (Currently Amended) The method of claim 17, wherein the processor system comprises a number of processors that is at least equal to ~~the~~ a number of image reconstruction volume segments dividedthat the system divides the target

~~volume into and each segment reconstruction is carried out using a different processor of the plurality of processors~~.

19. (Currently Amended) The system of claim 16, wherein the image is not formed from voxels corresponding to the underdetermined peripheral region~~volume segments overlap~~.

20. (Currently Amended) The system of claim ~~19~~16, wherein the volume segments overlap by a~~n~~ predetermined amount ~~sufficient to result in a three-dimensional reconstruction of the target volume that does not differ substantially in quality from an unsegmented reconstruction~~.

21. (Currently Amended) The system of claim 20, wherein the ~~value of a majority of the pixels in the three-dimensional reconstruction of the target volume differ by less than about 1% from pixels in the unsegmented reconstruction~~predetermined amount is less than 50 percent.

22. (Currently Amended) The system of claim ~~19~~20, wherein the ~~volume segments overlap by between about 0 and~~ predetermined amount is at least 50 percent.

23. (Currently Amended) The system of claim 16, wherein the volume segments comprise ~~volume segments~~ have~~ing~~ a complex shape ~~that is~~ dependent upon ~~the~~ an acquisition geometry and ~~makes the~~ configured to allow reconstruction of ~~each~~ a given volume segment independent of ~~the~~ reconstruction of ~~any~~ other volume segments.

24. Canceled.

25. (Currently Amended) The system of claim 24, wherein ~~the~~ reconstructing each volume segment~~s comprise volume segments having a slanted rectangular shape so that the reconstruction of each segment is independent of the reconstruction of any other segment~~ includes performing a shift of slice center operation.

26. (Currently Amended) The system of claim 24, wherein a shift amount applied by the shift of slice center operation is determined by at least one of a distance of a portion of the target volume from a detector of the imaging system, a slope of slant of the portion of the target volume, and a slope of a slanted volume varied for each volume segments ~~comprise volume segments having a slanted rectangular shape and having a base that corresponds to a plurality of consecutive detector pixel rows that are parallel to and spaced apart from the first plane, each slanted rectangular volume segment extending from its base in a direction toward the radiation source~~.

27-44. Canceled.

45. (New) The method of claim 1, wherein the plurality of partially overlapping volume segments overlap neighboring volume segments by a predetermined percentage.

46. (New) The method of claim 45, wherein the predetermined percentage is less than 50 percent.

47. (New) The method of claim 45, wherein the predetermined percentage is at least 50 percent.